DIRECTIONS FOR THE DEVELOPMENT OF THE OIL AND GAS CHEMICAL COMPLEX AS THE MAIN SECTOR OF THE ECONOMY IN THE REGION

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Abstract: The information base of the research was provided by the data of statistical bodies, actual materials characterizing various aspects of the functioning of individual enterprises and the oil and gas chemical complex as a whole. Scientific novelty consists in the development and substantiation of a number of theoretical and methodological provisions and practical recommendations for the development of a strategy for the development of the oil and gas chemical complex within the region in the territory of which hydrocarbon and mineral resources are extracted and processed, aimed at socio-economic development and enhancing the competitiveness of the region. The practical significance of the research is that the recommendations contained in the work allow us to develop the main provisions of the strategy for the development of the regional oil and gas chemical complex, increase the level of use of raw materials and will contribute to the development of the region's social and economic system in a market economy. The materials of the article can serve as the basis for improving the functioning of the oil and gas chemical complex in the regions of Russia. The stable functioning and development of the oil and gas chemical complex is constrained by a number of factors, but at the same time, the Russian regions have all the conditions for the development of the oil and gas chemical industry in the future. The current state of affairs makes it difficult to solve the most important social and economic problems of the regions and the country as a whole and requires clarifying the priorities for the development of the oil and gas chemical complex, both regions and Russia in general, and the state's tasks in the field of its development. In connection with this, the Ministry of Industry and Energy of the Russian Federation presented the "Strategy for the Development of the Chemical and Petrochemical Industry of Russia".

Key words: regional economy, oil and gas chemical complex, network diagram, PERT method.

1 Introduction

The objective of the energy policy of Russia is to maximize the effective use of natural energy resources and the potential of the energy sector to sustain economic growth, improve the quality of life of the population and promote strengthening of foreign economic positions of the country.

The Strategy determines objectives and goals of the Russian energy sector long-term development for the up-coming period, its priorities and guidelines, as well as mechanisms of the state energy policy at the implementation phases of the Strategy ensuring realization of the stated objectives. As a result of consideration and analysis of the "Strategy for the development of the chemical and petrochemical industry in Russia", we can conclude that it is possible and appropriate to adapt its main provisions to the level of the regional petrochemical complex, taking into account the specifics of a specific region, the level of its development and the state of the petrochemical complex. Proceeding from the all-Russian problems, the specifics of the region, and the main provisions of the Strategy for the development of the industry, it is possible to identify the formation of a regional territorial production system of an international level with a high quality and range of products and services that provides a sustainably favorable ecological situation as a priority objective of the development strategy for a regional petrochemical complex , a high level of social comfort, within the framework of rational nature and resource use (Table 1).

Based on the development goal of the regional oil and gas chemical complex, the following priority directions of its development strategy can be formulated:

1. Development and development of the mineral and raw materials base of the region for increasing the efficiency of raw materials supply to enterprises of the oil and gas chemical complex (Hassan & Alfadala, 2009; Villalobos Antúnez et al, 2013).
2. Development of competitive productions on the basis of modernization and introduction of the latest technologies and scientific and technical achievements within the framework of rational nature and resource management and environmental safety of production.
3. Development and formation of the potential of highly qualified scientific and technical personnel for the enterprises of the oil and gas chemical complex of the region (Beilin, 2016).
4. Harmonization of interaction between regional authorities and the subjects of the oil and gas chemical complex in terms of rational involvement of the mineral and resource base of the territory in the process of production and economic activities with the aim of developing the entire social and economic system of the region (Beilin, 2017; Dashkin, 2017).

The main directions of the development strategy for the regional oil and gas chemical complex described below are detailed and justified.

1. Development of raw materials for the production of chemical products and improving the efficiency of raw materials supply to enterprises of the regional petrochemical complex (Beilin, & Arkhireev, 2006; Beilin & Arkhireev, 2009; Beilin & Arkhireev, 2005). To ensure intensive growth of petrochemical production, it is necessary, first of all, to have the appropriate raw materials base, for the creation of which it is expedient to implement the following measures:

- implementation and monitoring of the implementation of the activities of the program aimed at the balanced development of the mineral resource base of the Republic of Tatarstan, ensuring the stabilization of revenues when using subsoil, taking into account the current and future needs of the territory for sustainable social and economic development of the region;
- introduction and development of technologies for deeper processing of raw materials and secondary resources using knowledge-intensive, resource-saving and environmentally friendly technologies (Qstergaard, 2015; Porter, 1998; Porter, 2003);
- to contribute to the solution of the problem of efficient use of natural resources, introduction of progressive forms of resource use, compliance with environmental norms and requirements.

2. Creation of new competitive productions, technical re-equipment and modernization of existing enterprises and industries on the basis of advanced scientific and technical achievements (Beilin & Arkhireev, 2011; Beilin & Arkhireev, 2011).

- technical re-equipment and modernization of the existing and creation of new production facilities, in order to ensure the release of marketable petrochemical products;
- stimulation of innovative and investment activity in the petrochemical complex, presupposes the concentration of financial and material resources aimed at supporting advanced scientific developments, the introduction of advanced technologies;
- increase the share of knowledge-intensive and high-value added products, implement qualitative changes in the sectoral and specific structure of the petrochemical complex in the direction of reducing the share of raw materials industries;
- to promote the development of a high-tech transport infrastructure in order to increase the volume and safety of the transport of chemical goods (Sölvell, 2008).

3. Development and organization of production of new types of competitive chemical products:

- saturation of the market with competitive products, formation of export potential and development of import-substituting industries, mainly due to deeper processing of

raw materials using knowledge-intensive, resource-saving and environmentally friendly technologies;
- expansion of the range and improvement of consumer properties of socially-oriented products;
- ensuring the need for strategic materials;
- implementation of customs and tariff policy to protect domestic producers in the domestic and foreign markets (Stewart, 1983; Levidow et al, 2016; Hirsch, 2014).

Table 1. The main driving factors and constraints that inhibit the development of the oil and gas chemical complex

Constraints and limitations.	Driving factors and development prerequisites.
Insufficient level of scientific and technical developments and their implementation in the petrochemical industry.	The Russian Federation has a fairly strong raw material base.
High degree of physical deterioration of equipment, backwardness of technologies and low competitiveness of products.	Favorable conjuncture in the world market of petrochemical products. The uniqueness of some productions and products on the world market.
Disparity of prices and tariffs for products of natural monopolies.	The presence of a rapidly developing domestic market and the demand potential for petrochemical products.
Deficiency of investment resources.	Availability of inexpensive and skilled labor.
Reduction of demand for products of low-tonnage chemistry in the domestic market, first of all, from high-tech industries and defense complex.	The presence of a number of scientific and technical developments, the introduction of which will ensure the modernization of existing and the creation of new competitive productions.
Sustainable development of the chemical and petrochemical industry is impossible without solving the problem of providing enterprises of the industry with hydrocarbon raw materials, on the basis of which up to 80% of production is produced.	The presence of a large production infrastructure at the enterprises of the petrochemical complex, the physical wear and tear of which is much lower than the wear of the main technological equipment.

2 Methodology

The PERT method is often used in project management and process analysis. The PERT method is a tool that calculates the expected duration of a project or a single process. The PERT method and the critical path method are fundamentally different in their application. The critical path method is used to estimate the completion time of the entire project or groups of interrelated tasks, and the PERT method is used to estimate the duration of individual tasks.

The very idea of the method is very simple - in order to assess the time of the task or process, you need to know the optimistic, pessimistic and most probable estimate of the duration of this task. The PERT formula looks like this:

$$E = \frac{(O + 4M + P)}{6}$$

• O - an optimistic estimate of the duration of the task,

• M - the most probable estimate of the duration of the task,

• P - a pessimistic estimate of the duration of the task.

This equation is a weighted average, where the most probable estimate of duration has a weight four times greater than an optimistic and pessimistic estimate. This approach prevents too much distortion in one direction.

In order to better analyze and predict the duration of tasks, it is possible to calculate the standard deviation and variance of the PERT estimate by adapting the usual formula for statistical dispersion:

$$D = \frac{(O - E)^2 + 4\,(M - E)^2 + (P - E)^3}{6}$$

$$STD = \sqrt{((O - E)\text{^}2 + 4\,(M - E)\text{^}2 + (P - E)\text{^}3)/6}$$

Dispersion, in this case, speaks about the level of scatter of optimistic, pessimistic and most probable values from their average. To quickly calculate the standard deviation, a simpler but less precise formula is often used:

Standard deviation = (E — O) / 6

The smaller the standard deviation, the closer together optimistic, pessimistic and most probable estimates of the duration of the problem are grouped together.

3 Results and Discussion

The petrochemical complex has a high degree of cooperation of production from the extraction of hydrocarbon and mineral resources to the output of finished products is the optimal environment for vertical integration (Beilin, 2017). Large petrochemical enterprises are the "points of growth" of the entire oil and gas chemical complex, as they have all the possibilities to concentrate the resources necessary for the proportional development of production, to effectively solve the social and environmental problems of the territory within the framework of the development of their enterprises(Qing, 2007). Large enterprises with state participation should be regarded as the main agents of power in the practical implementation of the regional strategy for the development of the oil and gas chemical complex and state industrial policy (Fig 1).

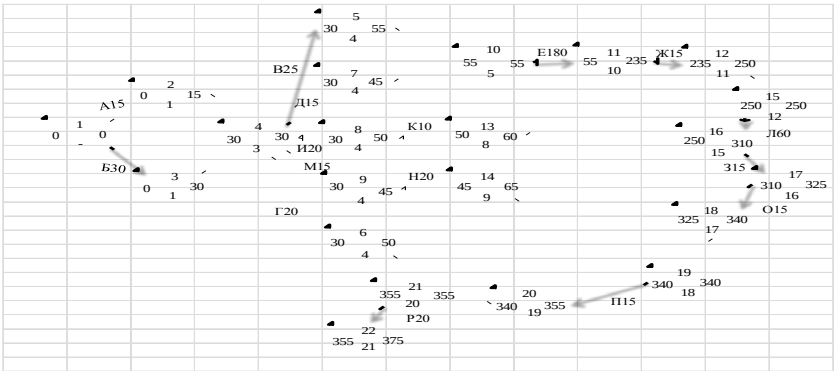

Fig 1. Network schedule for the practical implementation of the regional strategy for the development of the oil and gas chemical complex and state industrial policy

The mechanism of interaction between regional authorities and large industrial petrochemical enterprises should provide for:

- conducting institutional reforms for more efficient management of the petrochemical complex and enhancing its competitiveness;
- improvement of regional legislation in order to create favorable conditions for the development of the petrochemical complex, introduction and development of market economic regulators (tax and customs regulation);
- conclusion of long-term strategic agreements with large oil and gas chemical companies that determine the ways, conditions and terms for achieving socially-directed goals and special agreements in the case of large-scale investment projects and providing for state guarantees for attracting foreign investments, benefits for using land, hydrocarbon and mineral resources (Fig 2).

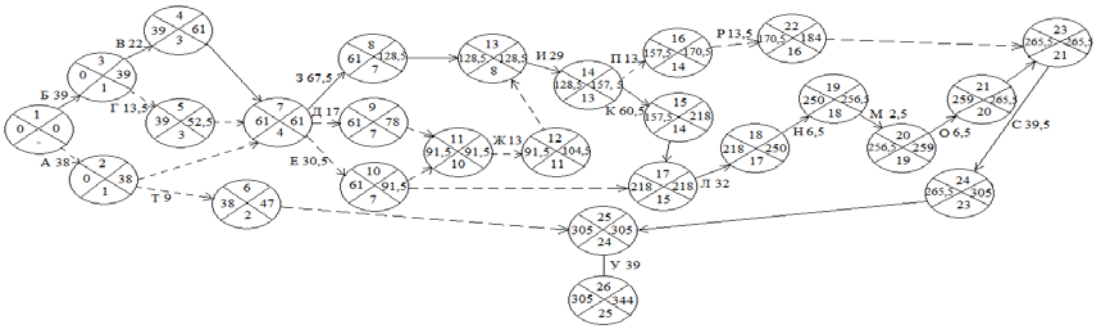

Fig 2. PERT diagram of the mechanism of interaction of regional authorities with large industrial oil and gas chemical enterprises.

4 Summary

The expected effect from the implementation of the proposed areas of strategic development of the regional petrochemical complex is considered as a multi-level (Table 2).

Table 2. The expected effect from the implementation of the priority areas of the development strategy for the regional petrochemical complex

At the macro level	At the micro level
Increase in the contribution of the petrochemical complex to GDP growth due to outstripping growth in production and sales of products in relation to the dynamics of the country's economic growth.	Provision of regional market demand in petrochemical products by volume, assortment and quality.
Improving the structure of foreign trade turnover, weakening the dependence of the country's economy on the import of science-intensive oil and gas chemical products, expansion of high-tech exports.	Formation in the oil and gas chemical complex of the region of effective market-oriented, business-structures of the new generation that have the potential for self-development.
Increase in tax revenues in the consolidated budget of the Russian Federation.	Increase of innovative activity and level of renewal of fixed assets of enterprises of oil and gas chemical industry and related industries.
Increase in export earnings.	Increase in labor productivity.
Reducing the dependence of the national economy on the supply of petrochemical products from foreign countries.	Preservation of jobs, prevention of outflow of talented, qualified part of scientific and technical personnel to other industries, regions and abroad.

5 Conclusions

The implementation of the set of proposed activities within the priority areas of the strategy for the development of the regional petrochemical complex will allow in the coming years to strengthen the positions of Russian producers in the world markets for petrochemical products, enhance the competitiveness of industry enterprises in the domestic market of Russia, increase labor productivity, create favorable conditions for investment inflow and subsequent sustainable development of both regional petrochemical complexes and the industry as a whole in the long term perspective.

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